

Implementation of a Digital Creative Industry Extracurricular Program for Students' Digital Literacy

Rike Nursafitri^{1✉}, Ari Septian², Muhammad Fikri Irfanuddin³, Kurnia Annisa Santi⁴, Gilang Dicky Setiawan⁵

¹ Master's Program in Electronics and Informatics Engineering Education, Faculty of Engineering, Yogyakarta State University, Yogyakarta 55281, Indonesia.

^{2,3,4,5} Informatics Engineering Education, Faculty of Teacher Training and Education, Universitas Muhammadiyah Surakarta, Surakarta 57162, Indonesia.

rikenursafitri.2026@student.uny.ac.id

Abstract

The rapid development of digital technology requires students to have adequate digital literacy, not only to understand information but also to use technology creatively and responsibly. This study aims to describe the implementation of the Digital Creative Industry (*Industri Kreatif Digital*, IKD) extracurricular program at SMA Muhammadiyah 2 Surakarta, Indonesia, and to examine students' activeness, perceptions, and practical digital literacy after participating in the program, which covered graphic design, video editing, and photography. A descriptive quantitative design was employed. Data were collected from 30 program participants through observation and a questionnaire and were analyzed descriptively using frequency distributions and percentages. The results show that 80% of the students considered storytelling important in digital literacy learning, practice was the dominant learning model (77%), and 70% of the students regarded video as the most effective type of digital content. In their creative work, most students used Canva for graphic design, chose sans-serif typefaces, edited videos with CapCut, and photographed natural objects, particularly flowers. The students also demonstrated a good understanding of digital content and enjoyed participating in the program. These findings indicate that the IKD extracurricular program supported students' activeness, understanding, and practical digital literacy skills, and that practice-oriented extracurricular programs are a promising means of strengthening digital literacy in senior high schools. Further studies with a controlled design are needed to confirm the effect of the program.

Keywords: digital literacy, digital creative industry, extracurricular program, implementation, senior high school

Jurnal PTI is licensed under a Creative Commons Attribution-Share Alike 4.0 International License.



1. Introduction

The global development of digital technology has brought fundamental changes to many aspects of human life, including education and employment. Digital literacy is no longer merely an added value but a basic need that every individual must possess in order to compete amid rapid digital transformation. It covers not only the understanding of digital content but also the technical ability to operate information and communication technology (ICT) devices, including skills in videography, photography, and graphic design [1]. To adapt to the digital era, young people also need to master 21st-century skills, namely critical thinking, creativity, communication, and collaboration, commonly abbreviated as the 4Cs [2].

In Indonesia, the number of internet users has continued to increase. The latest survey by the Indonesian Internet Service Providers Association (*Asosiasi Penyelenggara Jasa Internet Indonesia*, APJII) recorded that national internet penetration in 2026 reached 81.72%, or approximately 235 million people, up from 80.66% in

the previous year, and that penetration among people with senior high school education reached 90.44% [3]. This growth, however, has not been matched by the digital literacy readiness of the public. The national digital literacy index in 2022 was only 3.54 on a five-point scale, and the digital safety pillar received the lowest score [4]. Online fraud, privacy violations, gadget addiction, and the spread of hoaxes are still widespread, and these problems largely stem from the low level of digital literacy in society [5]. For Indonesia to compete in the digital era, education that optimizes the use of digital technology is needed [6]. The Merdeka Curriculum (*Kurikulum Merdeka*) responds to this need by aiming to develop 21st-century competencies [7] and by giving schools the flexibility to add programs according to their needs [8].

The concept of digital literacy has expanded considerably since Gilster defined it as the ability to understand and use information in multiple formats presented via computers [9]. Eshet-Alkalai distinguished photo-visual, reproduction, branching, information, and socio-emotional literacy, of which

photo-visual and reproduction literacy relate most closely to creative production such as graphic design, photography, and video editing [10]. Ng described digital literacy as the intersection of technical, cognitive, and social-emotional dimensions [11], and the UNESCO Digital Literacy Global Framework explicitly includes digital content creation as a competence area [12]. Digital skills are also closely intertwined with 21st-century skills such as creativity, communication, and problem solving [13]. In Indonesia, digital literacy is measured through four pillars, namely digital skills, digital ethics, digital safety, and digital culture [4]. Hobbs further argues that creating multimedia texts with free and low-cost tools is itself a powerful way of learning, because composing images and videos helps learners internalize ideas while developing critical thinking and communication skills [14]. In this study, digital literacy is therefore understood as students' understanding of digital content together with their ability to use digital tools to produce graphic designs, videos, and photographs.

Creative production of this kind is closely linked to the creative economy. Law No. 24 of 2019 defines the creative economy as the manifestation of added value from intellectual property originating from human creativity [15], and its implementing regulation groups creative activities into 17 subsectors, including visual communication design, film, animation and video, and photography [16]. Extracurricular activities offer a suitable space to introduce these fields. The national regulation defines extracurricular activities as activities carried out outside regular learning hours to develop students' potential, talents, and interests, and requires elective activities to follow the principles of active participation and enjoyment [17]. Participation in extracurricular activities has been associated with positive academic and psychological outcomes [18], [19], and such activities allow practice-oriented learning in which knowledge is created through the transformation of experience [20], provided that adequate scaffolding is given [21]. Digital storytelling, which combines narrative with images, audio, and video, has likewise been described as a powerful tool for developing several literacies at once [22].

SMA Muhammadiyah 2 Surakarta is one of the schools that has used the flexibility of the Merdeka Curriculum by offering the Digital Creative Industry (*Industri Kreatif Digital*, IKD) extracurricular program. Preliminary observations and interviews at the school, however, found that the teachers were not yet fully prepared to deliver digital creative industry training, owing to their limited competence in this field and the fact that the school had only one ICT teacher. Previous studies have largely discussed digital literacy at the conceptual and policy levels or among the general population [1], [4], [5], while research on extracurricular activities has focused on academic and psychosocial outcomes [18], [19]. Empirical evidence

on how a school-based extracurricular program focusing on creative digital production supports the digital literacy of senior high school students, particularly in schools with limited ICT teaching resources, is still limited.

This study therefore aims to describe the implementation of digital literacy activities through the IKD extracurricular program at SMA Muhammadiyah 2 Surakarta, to examine students' activeness, perceptions, and understanding of digital literacy after participating in the program, and to describe the implementation of digital literacy in graphic design, videography, and photography. The study contributes a descriptive account of a practice-oriented digital creative program in a school with limited ICT staff, which can inform other schools that wish to use the flexibility of the Merdeka Curriculum to develop students' digital literacy through extracurricular activities.

2. Methods

2.1 Research Design and Participants

This study employed a descriptive quantitative design. A survey design provides a numerical description of the trends, attitudes, or opinions of a population by studying a sample of that population, without manipulating the variables studied [23]. The survey was complemented by observation of the learning activities, so that the numerical data on students' perceptions and practices could be interpreted in the context of how the program was actually delivered.

The study was conducted at SMA Muhammadiyah 2 Surakarta, a private senior high school in Surakarta, Central Java, Indonesia, for two months, from October to November 2022. The participants were students who actively took part in the IKD extracurricular program. Because students join elective extracurricular programs according to their own interests, the participants were not randomly selected. A total of 30 program participants completed the questionnaire.

2.2 IKD Program and Data Collection

The IKD extracurricular program was held every Wednesday, with a duration of 2×60 minutes per meeting. The program covered three main materials, namely graphic design, photography, and videography, which correspond to the visual communication design, photography, and film, animation and video subsectors of the creative economy [16]. Learning was delivered through lectures that introduced concepts and practice sessions in which students directly used digital applications on computers and smartphones to produce creative works.

Data were collected using observation and a questionnaire. Observation was conducted to record the learning methods used, the applications operated by the

students, and the creative works they produced during the IKD sessions. The questionnaire was administered after the students had completed the series of extracurricular activities. The overall sequence of research activities is illustrated in Figure 1.

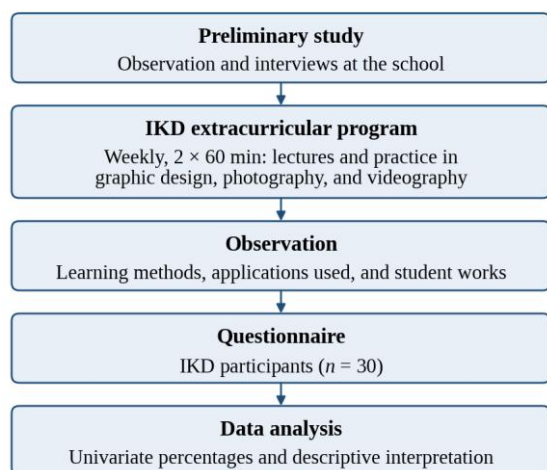


Figure 1. Research procedure

The questionnaire collected data on students' perceptions of learning, their understanding of the digital creative industry concept, and the implementation of digital literacy in graphic design, videography, and photography. The aspects and indicators measured by the questionnaire are shown in Table 1.

Table 1. Questionnaire aspects and indicators

Aspect	Indicator	Result
Perception of learning	Importance of storytelling in digital literacy learning	Figure 2
	Learning model applied in the program	Figure 3
Understanding of the IKD concept	Definition of the digital creative industry	Section 3.2
	Digital creative industry companies known and liked	Figure 4
	Type of digital content considered most effective	Figure 5
Graphic design	Design platform used	Figure 6
	Typeface used	Figure 7
Videography	Video editing application used	Figure 8
Photography	Object photographed	Figure 9

2.3 Data Analysis

The questionnaire data were analyzed using univariate analysis, which describes the frequency distribution of

each variable. The percentage of each response category was calculated using formula 1.

$$P = \frac{f}{N} \times 100\% \quad (1)$$

In formula 1, P is the percentage of a response category, f is the number of students who chose that category, and N is the total number of respondents. The results are presented as pie charts and bar charts and are interpreted descriptively.

The observation data were used to describe the implementation of the program and to support the interpretation of the questionnaire results. Findings were then compared with previous studies and with the digital literacy frameworks outlined in the introduction.

3. Results and Discussions

Data collection began with observation of the IKD learning activities and continued with the administration of the questionnaire to the program participants. The 30 respondents were students of SMA Muhammadiyah 2 Surakarta who actively took part in the weekly IKD sessions on graphic design, photography, and videography, and their responses form the basis of the univariate analysis below.

The results are organized from students' perceptions of the learning process, through their understanding of the digital creative industry concept, to the implementation of digital literacy in the three production fields, followed by a discussion of the findings and the limitations of the study.

3.1 Program Implementation and Learning Perceptions

Observation showed that the IKD program was implemented as a weekly flagship extracurricular activity that combined explanations of concepts with hands-on practice. In each session, students used applications on computers and smartphones to produce graphic designs, photographs, and videos, so that the learning process centered on the production of concrete works.

One aspect measured was students' views on the relevance of storytelling in digital literacy learning. As shown in Figure 2, the majority of the students (80%) stated that storytelling is an important element of digital literacy learning, while the remaining 20% considered that it does not play a significant role. The students who considered storytelling important argued that this approach encourages their interest in reading and makes it easier for them to understand digital literacy material as a whole.

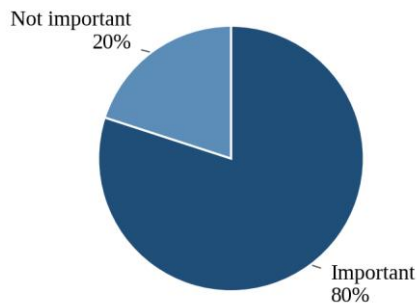


Figure 2. Students' perceptions of the importance of storytelling (n = 30)

The study also examined the learning model most frequently applied in the IKD activities. As illustrated in Figure 3, practice was the dominant method, chosen by 23 students (77%), whereas lectures were chosen by seven students (23%). The high prevalence of practice reflects students' preference for learning through direct experience, because practice allows them to acquire technical skills concretely rather than relying solely on the instructor's verbal explanation.

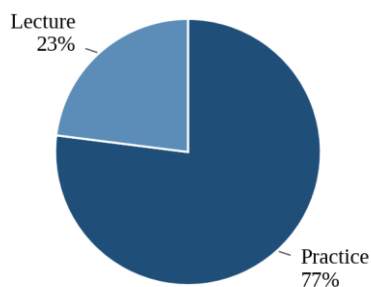


Figure 3. Learning models applied in the IKD program (n = 30)

3.2 Understanding of the Digital Creative Industry

After participating in the IKD activities, the students demonstrated a good understanding of the basic concept of the digital creative industry. Most students were able to define IKD as an extracurricular program that equips students with knowledge in the field of creative technology, including video editing, graphic design, and photography.

Students' understanding was also reflected in their ability to name relevant examples. As shown in Figure 4, when asked about the digital creative industry companies they knew and liked, 17 students mentioned Gojek, nine students mentioned Tokopedia, and the remaining four students mentioned other companies. These results show that the students associate the digital creative industry mainly with large Indonesian digital platform companies that they encounter in daily life.

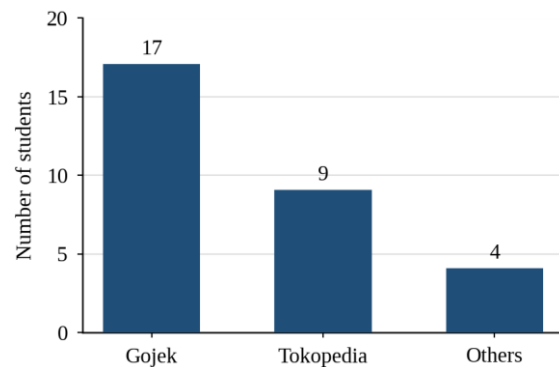


Figure 4. Digital creative industry companies known and liked by students (n = 30)

Another aspect measured was students' perception of the type of digital content that is most effective in conveying information. The results in Figure 5 show that 70% of the students chose video, followed by images (13%), text (10%), and audio (7%). The students preferred video because they considered this format more interactive, more attractive, and more capable of conveying information comprehensively than other formats.

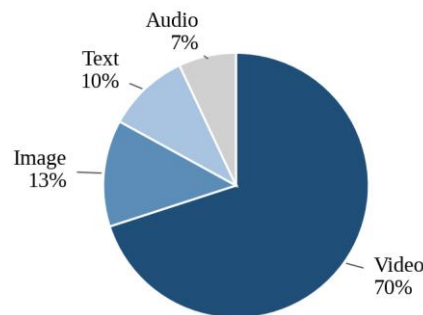


Figure 5. Types of digital content considered most effective by students (n = 30)

3.3 Digital Literacy in Graphic Design

Digital literacy in graphic design was measured through the digital platform used and the choice of typeface. As shown in Figure 6, the students used four platforms: Canva was used by 24 students, CorelDRAW by three students, Picsart by two students, and PixelLab by one student. Canva was therefore the dominant platform, which can be attributed to its easy access through both the website and the smartphone application, a user-friendly yet feature-rich interface, thousands of ready-to-use templates, and flexible download formats.

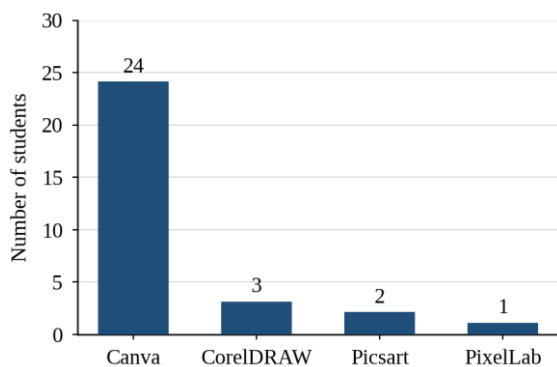


Figure 6. Digital platforms used by students to create graphic designs ($n = 30$)

For typeface use, Figure 7 shows that 18 students used sans-serif typefaces, seven students used Calibri, and the other five students chose other typefaces. Sans-serif typefaces were thus the most frequently chosen, possibly because of their clean, modern, and easy-to-read character across digital media. Because Calibri is itself a sans-serif typeface, in total 25 of the 30 students (83.3%) used sans-serif typography.

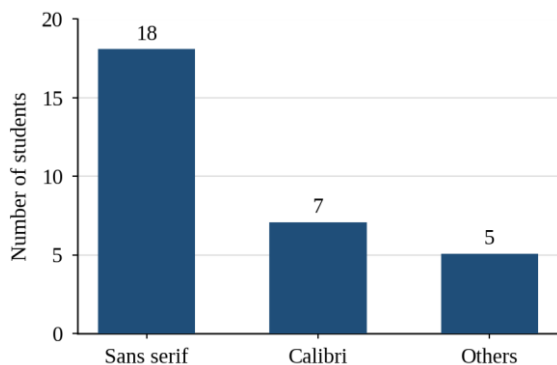


Figure 7. Typefaces used by students in graphic design works ($n = 30$)

3.4 Digital Literacy in Videography and Photography

Digital literacy in videography was measured by the video editing applications used by the students. As shown in Figure 8, four applications were used: CapCut by 15 students, Adobe Premiere Pro by seven students, InShot by five students, and VN by three students. CapCut was the most widely chosen application, which is understandable because it is easy to operate, can be accessed anytime through mobile devices, and offers creative features such as clip trimming, animated stickers, background music, and video layout settings that match the content production needs of today's teenagers.

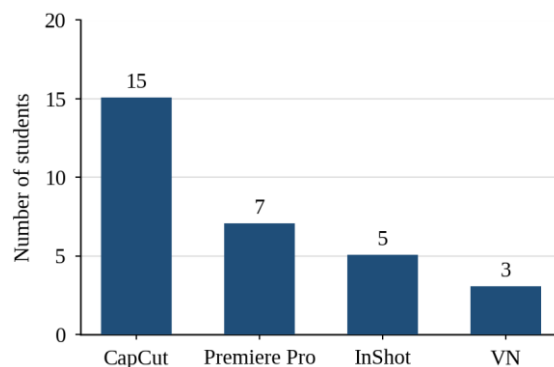


Figure 8. Video editing applications used by students ($n = 30$)

In photography, digital literacy was identified through the types of objects photographed by the students during the study period. As illustrated in Figure 9, flowers were chosen most often (60%), followed by rice fields (20%), streets (13%), and the sea (7%). The students' strong interest in photographing flowers can be attributed to their varied shapes and colors, which present artistic challenges, and to their symbolic value of beauty, making them an aesthetic and educational choice for beginners.

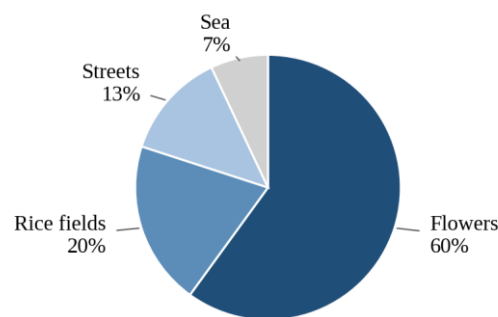


Figure 9. Objects photographed by students ($n = 30$)

3.5 Discussion

Table 2 summarizes the dominant response for each indicator. Overall, the students who participated in the IKD program were able not only to understand digital content but also to operate digital tools to produce creative works. The program mainly strengthened the technical dimension of digital literacy [11] as well as photo-visual and reproduction literacy [10], which are central to the digital content creation competence area of the UNESCO framework [12]. These findings support the view that digital literacy involves production as well as understanding [14].

Table 2. Summary of univariate results

Indicator	Dominant response	Share (%)
Importance of storytelling	Important	80.0
Learning model	Practice	76.7
Known creative industry company	Gojek	56.7
Most effective digital content	Video	70.0
Graphic design platform	Canva	80.0
Typeface	Sans serif	60.0
Video editing application	CapCut	50.0
Photographic object	Flowers	60.0

The dominance of practice (77%) is in line with experiential learning theory, which holds that knowledge is built through the transformation of concrete experience [20]. Skills such as layout, typography, framing, and video editing can hardly be acquired through verbal explanation alone. At the same time, lectures still accounted for 23% of the learning activities, which can be viewed positively because effective project-based learning requires a balance between direct instruction and inquiry, as well as adequate scaffolding [21]. For schools with limited ICT staff, short explanations of concepts followed by guided practice appear to be a realistic model.

The high proportion of students who considered storytelling important (80%) and who regarded video as the most effective content (70%) points to the same tendency. Digital storytelling engages students while developing several literacies at once [22], and a multi-site case study found that it created more engaging learning environments and deeper student engagement [24]. The preference for video is also consistent with the multimedia principle, which states that people learn more deeply from words and pictures than from words alone [25], and with guidelines showing that well-designed educational videos support learning [26]. Future IKD activities could therefore integrate the three materials into storytelling-based video projects.

The dominance of Canva (80%) and CapCut (50%) shows that the students tend to choose free, template-based, and mobile-friendly applications. This pattern is consistent with a recent survey of Indonesian university students, most of whom perceived Canva as easy to use and useful for their visual communication skills and digital literacy [27]. Such tools lower the entry barrier to creative production, but heavy reliance on templates may limit students' understanding of design principles such as hierarchy, contrast, and composition. The choice of sans-serif typefaces by 25 of the 30 students

indicates an emerging awareness of on-screen readability, which instructors can build on by explicitly teaching the reasons behind design choices. The use of templates, stock images, and background music also provides an opportunity to address the digital ethics pillar, for example, respecting copyright when publishing works [4].

Although most students could define IKD in terms of the three materials they had learned, the companies they most often mentioned were Gojek and Tokopedia (Figure 4). Both are app-based platform companies encountered in daily life rather than examples from the visual communication design, film, animation and video, or photography subsectors represented by the IKD materials [16]. Students' conception of the digital creative industry is therefore still shaped largely by the consumer platforms they use, and the program could explicitly map its materials to the creative economy subsectors and introduce local designers, photographers, and video creators as role models. In photography, the predominance of flowers and other natural objects shows that students choose accessible and visually attractive subjects, and future activities could broaden this repertoire toward documentary or school-life themes that require more complex storytelling and ethical considerations, such as obtaining consent before photographing people.

Finally, students' positive perceptions and enjoyment of the program are consistent with the principles of active participation and enjoyment set for elective extracurricular activities [17] and with evidence linking extracurricular participation to positive student outcomes [18], [19]. Taken together, the results indicate that a practice-oriented extracurricular program can serve as a valuable complement to the regular curriculum in developing students' digital literacy, especially in schools where the number of ICT teachers is limited.

3.6 Limitations and Future Work

This study has several limitations. It was conducted in a single school with a relatively small number of respondents, so the results cannot be generalized to all senior high schools, and the two-month research period is relatively short for observing the development of digital literacy. Most importantly, the study used a descriptive design without a comparison group or measurements before and after the program. The results therefore describe students' perceptions and practices after participating in the IKD program, but they cannot establish that the program caused an improvement in digital literacy, since students who choose a digital creative extracurricular activity may already have a stronger interest in digital media. In addition, the data rely mainly on a researcher-developed questionnaire with self-reported responses, which may be influenced by social desirability.

Future research should use a quasi-experimental design with pretest and posttest measurements of experimental and control groups [28], [23] and involve more schools over a longer program duration. Future studies should also use instruments whose validity and reliability have been tested, assess students' creative works with a rubric, and measure other pillars of digital literacy, particularly digital ethics and digital safety [4].

4. Conclusions

This study described the implementation of the Digital Creative Industry extracurricular program at SMA Muhammadiyah 2 Surakarta and the digital literacy demonstrated by its participants. The program was delivered weekly through a combination of short lectures and hands-on practice in graphic design, photography, and videography, with practice being the method preferred by most students (77%) because it allowed them to learn technical aspects directly. After participating in the program, the 30 students were able to define the digital creative industry in terms of the materials they had learned and to apply these materials in their own creative works, using Canva for graphic design, CapCut and Adobe Premiere Pro for video editing, and a range of natural objects for photography. Most students also regarded storytelling as important (80%) and video as the most effective form of digital content (70%). These results answer the research objectives by showing that the program supported students' activeness, understanding, and practical digital literacy skills, particularly in the technical, photo-visual, and reproduction dimensions of digital literacy. The main contribution of this study is a descriptive account of how a practice-oriented digital creative program can be implemented in a school with only one ICT teacher, showing that free, mobile-friendly applications and guided practice make creative digital production accessible to senior high school students. In practice, schools that intend to develop similar programs are recommended to combine brief explanations of concepts with guided practice, to integrate the three materials into storytelling-based projects, to connect them explicitly with creative economy careers, and to include digital ethics and safety in every production activity. Because this study was descriptive and conducted in one school, future studies should confirm the effect of such programs using a quasi-experimental design with a control group and pretest–posttest measurements involving more schools over a longer period.

Acknowledgments

The authors thank the students of SMA Muhammadiyah 2 Surakarta who participated in the IKD program and in this study.

Funding Information

Authors state no funding involved.

Author Contributions Statement

The contributions of each author to this study are presented in the following table based on the Contributor Roles Taxonomy (CRediT).

Name of Author	C	M	So	Va	Fo	I	R	D	W
Rike Nursafitri	✓		✓						
Ari Septian		✓		✓	✓				
Muhammad Fikri Irfanuddin			✓			✓		✓	
Kurnia Annisa Santi	✓								
Gilang Dicky Setiawan				✓			✓		✓

C : Conceptualization I : Investigation
M : Methodology R : Resources
So : Software D : Data Curation
Va : Validation W : Writing - Review
Fo : Formal analysis

Conflict of Interest Statement

Authors state no conflict of interest.

Data Availability

The authors confirm that the data supporting the findings of this study are available within the article.

References

- [1] I. M. Putrayasa, I. G. Suwindia, and I. M. A. Winangun, "Transformasi literasi di era digital: Tantangan dan peluang untuk generasi muda," *Education and Social Sciences Review*, vol. 5, no. 2, pp. 156–165, 2024, doi: 10.29210/07essr501400.
- [2] I. Nurhayati, K. S. E. Pramono, and A. Farida, "Keterampilan 4C (critical thinking, creativity, communication and collaboration) dalam pembelajaran IPS untuk menjawab tantangan abad 21," *Jurnal Basicedu*, vol. 8, no. 1, pp. 36–43, 2024, doi: 10.31004/basicedu.v8i1.6842.
- [3] Asosiasi Penyelenggara Jasa Internet Indonesia (APJII), "Survei profil internet Indonesia 2026," Jakarta, Indonesia, May 2026. [Online]. Available: <https://survei.apjii.or.id/>
- [4] Kementerian Komunikasi dan Informatika and Katadata Insight Center, "Status literasi digital di Indonesia 2022," Jakarta, Indonesia, 2023.
- [5] C. Afrina, S. R. Zulaikha, and Jumila, "Low digital literacy in Indonesia: Online media content analysis," *Record and Library Journal*, vol. 10, no. 2, pp. 374–387, 2024, doi: 10.20473/rlj.V10-I2.2024.374-387.
- [6] A. Ismunandar and A. P. Rini, "Implikasi era revolusi industri 4.0 terhadap pengembangan kemampuan sumber daya manusia di perguruan tinggi," *Jurnal Review Pendidikan dan Pengajaran*, vol. 7, no. 2, pp. 4831–4837, 2024, doi: 10.31004/jrpp.v7i2.27360.
- [7] J. G. Mongkau and R. D. H. Pangkey, "Kurikulum merdeka: Memperkuat keterampilan abad 21 untuk generasi emas," *Journal on Education*, vol. 6, no. 4, pp. 22018–22030, 2024, doi: 10.31004/joe.v6i4.6323.
- [8] S. Nursafinah, S. Aisah, and H. Pricilia, "Peran kurikulum merdeka untuk memajukan kualitas pembelajaran di sekolah," *Karimah Tauhid*, vol. 3, no. 8, pp. 9050–9059, 2024.
- [9] P. Gilster, *Digital Literacy*. New York, NY, USA: Wiley, 1997.
- [10] Y. Eshet-Alkalai, "Digital literacy: A conceptual framework for survival skills in the digital era," *Journal of Educational Multimedia and Hypermedia*, vol. 13, no. 1, pp. 93–106, 2004.

- [11] W. Ng, "Can we teach digital natives digital literacy?" *Computers & Education*, vol. 59, no. 3, pp. 1065–1078, 2012, doi: 10.1016/j.compedu.2012.04.016.
- [12] N. Law, D. Woo, J. de la Torre, and G. Wong, "A global framework of reference on digital literacy skills for indicator 4.4.2," UNESCO Institute for Statistics, Montreal, QC, Canada, Information Paper No. 51, 2018.
- [13] E. van Laar, A. J. A. M. van Deursen, J. A. G. M. van Dijk, and J. de Haan, "The relation between 21st-century skills and digital skills: A systematic literature review," *Computers in Human Behavior*, vol. 72, pp. 577–588, 2017, doi: 10.1016/j.chb.2017.03.010.
- [14] R. Hobbs, *Create to Learn: Introduction to Digital Literacy*. Hoboken, NJ, USA: Wiley-Blackwell, 2017.
- [15] *Undang-Undang Republik Indonesia Nomor 24 Tahun 2019 tentang Ekonomi Kreatif*. Jakarta, Indonesia, 2019.
- [16] *Peraturan Pemerintah Republik Indonesia Nomor 24 Tahun 2022 tentang Peraturan Pelaksanaan Undang-Undang Nomor 24 Tahun 2019 tentang Ekonomi Kreatif*. Jakarta, Indonesia, 2022.
- [17] *Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia Nomor 62 Tahun 2014 tentang Kegiatan Ekstrakurikuler pada Pendidikan Dasar dan Pendidikan Menengah*. Jakarta, Indonesia, 2014.
- [18] A. F. Feldman and J. L. Matjasko, "The role of school-based extracurricular activities in adolescent development: A comprehensive review and future directions," *Review of Educational Research*, vol. 75, no. 2, pp. 159–210, 2005, doi: 10.3102/00346543075002159.
- [19] J. A. Fredricks and J. S. Eccles, "Is extracurricular participation associated with beneficial outcomes? Concurrent and longitudinal relations," *Developmental Psychology*, vol. 42, no. 4, pp. 698–713, 2006, doi: 10.1037/0012-1649.42.4.698.
- [20] D. A. Kolb, *Experiential Learning: Experience as the Source of Learning and Development*. Englewood Cliffs, NJ, USA: Prentice-Hall, 1984.
- [21] D. Kokotsaki, V. Menzies, and A. Wiggins, "Project-based learning: A review of the literature," *Improving Schools*, vol. 19, no. 3, pp. 267–277, 2016, doi: 10.1177/1365480216659733.
- [22] B. R. Robin, "Digital storytelling: A powerful technology tool for the 21st century classroom," *Theory Into Practice*, vol. 47, no. 3, pp. 220–228, 2008, doi: 10.1080/00405840802153916.
- [23] J. W. Creswell and J. D. Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, 5th ed. Thousand Oaks, CA, USA: SAGE, 2018.
- [24] N. Smeda, E. Dakich, and N. Sharda, "The effectiveness of digital storytelling in the classrooms: A comprehensive study," *Smart Learning Environments*, vol. 1, no. 1, Art. no. 6, 2014, doi: 10.1186/s40561-014-0006-3.
- [25] R. E. Mayer, *Multimedia Learning*, 2nd ed. New York, NY, USA: Cambridge Univ. Press, 2009.
- [26] C. J. Brame, "Effective educational videos: Principles and guidelines for maximizing student learning from video content," *CBE—Life Sciences Education*, vol. 15, no. 4, Art. no. es6, 2016, doi: 10.1187/cbe.16-03-0125.
- [27] M. R. Waluya and W. N. F. Rabbah, "Students' perceptions of the perceived ease of use and perceived usefulness of Canva in learning," *PEDAGOGIA: Jurnal Ilmu Pendidikan*, vol. 23, no. 3, pp. 351–362, 2025, doi: 10.17509/pdgia.v23i3.99029.
- [28] G. Anantasia and S. R. Rindrayani, "Metodologi penelitian quasi eksperimen," *ADIBA: Journal of Education*, vol. 5, no. 2, pp. 183–192, 2025.